REMARKS

Applicants respectfully request reconsideration of the present patent application in view of the amendments set forth above and the remarks below.

Claims 1-15 are pending in the application. Claims 1 to 5 are rejected. Claim 6 is allowed. Claims 1 to 5 are amended herein. Claims 7 to 15 are new.

The Drawings

The Examiner indicates in paragraph 10 that drawings received on January 25, 2002 are acceptable. The Applicants also received a telephone message from the Examiner on February 6, 2002 indicating that no further action is required with respect to the drawings. Therefore, Applicants believe that the Examiner's statements in paragraph 9 of the Office action, requiring drawing corrections, are now moot.

The Rejections Under 35 U.S.C §102(a) and/or (e)

The Examiner rejects Claims 1-5 under 35 U.S.C. §102(a) and (e) as being anticipated by Gunderson et al. (US patent number 6,268,803). Regarding Claim 1, the Examiner asserts that Gunderson describes, "...a near object detection system[s] for use in an automotive obstacle detection warning radar system including, inter alia, a plurality of sensors which provide detection coverage in a 'predetermined coverage zone'."

Applicants submit that amended Claim 1 is patentably distinct over Gunderson et al., since the cited reference fails to describe or suggest "... a plurality of sensors, each of the sensors for providing range cell data in a predetermined coverage zone ...," as required by Claim 1.

In contrast, in FIGS. 28 and 29, Gunderson et al. describes a "track report generator" and a "data fusion." Applicants note that Gunderson et al. does not identify FIGS. 14-34 in the description of the preferred embodiments, and, in particular, does not

a

describe FIGS. 28 and 29. However, Applicants note that Gunderson et al. describes "Data Fusion" and "tracks" at column 14, lines 8-36, but fails to describe or suggest range cell data. Applicants submit that Gunderson et al. fails to teach the claimed range cell data provided by a plurality of sensors. Therefore, applicants submit that Claim 1 is patentably distinct over Gunderson et al.

Claim 2 depends from and thus includes the limitations of Claim 1. Thus, Claim 2 is patentably distinct over Gunderson et al. generally for the reasons discussed above in conjunction with Claim 1.

Claim 3 depends from and thus includes the limitations of Claim 1. Thus, Claim 3 is patentably distinct over Gunderson et al. generally for the reasons discussed above in conjunction with Claim 1. Claim 3 is further patentably distinct over Gunderson et al. since the cited reference neither describes nor suggests "... communication means for allowing information to be shared between each of the plurality of sensor processors."

Applicants submit that amended Claim 4 is patentably distinct over Gunderson et al., since the cited reference neither describes nor suggests that "...each of the sensors has a respective predetermined range, angular extent, and velocity range based upon respective zone requirements," required by Claim 4. With this particular arrangement, the Near Objection System can provide sensors about a vehicle, each sensor having different characteristics as described in Claim 4.

Claim 5 depends from and thus includes the limitations of Claim 4. Thus, Claim 5 is patentably distinct over Gunderson et al. generally for the reasons discussed above in conjunction with Claims 1 and 4.

G

New Claims 8 and 9 depend from and thus include the limitations of Claim 1. Thus, Claims 8 and 9 are patentably distinct over Gunderson et al. generally for the reasons discussed above in conjunction with Claim 1.

New Claim 10 depends from and thus includes the limitations of Claim 1. Thus, Claim 10 is patentably distinct over Gunderson et al. generally for the reasons discussed above in conjunction with Claim 1. Claim 10 is further patentably distinct over Gunderson et al. since the cited reference does not describe or suggest the "... transmitting an FMCW frequency..." and "... receiving the FMCW frequency," required by Claim 10.

New Claim 11 depends from and thus includes the limitations of Claim 1. Thus, Claim 11 is patentably distinct over Gunderson et al. generally for the reasons discussed above in conjunction with Claims 1.

New Claim 12 depends from and thus includes the limitations of Claim 1. Thus, Claim 12 is patentably distinct over Gunderson et al. generally for the reasons discussed above in conjunction with Claim 1. Claim 12 is further patentably distinct over the Gunderson et al. since the cited reference does not describe or suggest that, "... the predetermined coverage zone has zone characteristics, at least one of which can be statically changed," as required by Claim 12.

New Claim 13 depends from and thus includes the limitations of Claim 1. Thus, Claim 13 is patentably distinct over Gunderson et al. generally for the reasons discussed above in conjunction with Claim 1. Claim 13 is further patentably distinct over Gunderson et al. since the cited reference does not describe or suggest that, "... at least one of the zone characteristics can be dynamically changed to provide an alteration of a time period upon which the target sensor processes a particular transmit beam and a particular receive beam," required by Claim 13.

a

New Claim 14 depends from and thus includes the limitations of Claim 1. Thus, Claim 14 is patentably distinct over Gunderson et al. generally for the reasons discussed above in conjunction with Claim 1.

New Claim 15 depends from and thus includes the limitations of Claim 1. Thus, Claim 15 is patentably distinct over Gunderson et al. generally for the reasons discussed above in conjunction with Claim 1. Claim 15 is further patentably distinct over Gunderson et al. since the cited reference does not describe or suggest "... two or more distributed processors ... coupled to each other of the two or more distributed processors."

Claim 6 is allowed. New Claim 7 depends from and thus includes the limitations of allowed Claim 6. Thus, new Claim 7 is also allowable.

Accordingly, applicants submit that Claims 1-15 are condition for allowance and respectfully request a Notice of Allowance therefor.

The Examiner is invited to telephone the undersigned attorney to discuss any matter in furtherance of the present application.

a

The Commissioner is hereby authorized to charge any other fees under 37 C.F.R. §1.16 and §1.17 that may be required, or credit any overpayment, to our Deposit Account No. 50-0845.

Respectfully submitted,

Feb 6, 2003
Date

Kermit Robinson
Reg. No. 48,734
Attorney for the Applicant(s)
Daly, Crowley & Mofford, LLP
275 Turnpike Street, Suite 101
Canton, MA 02021-2310
Tel: (781) 401-9988 x24
Fax: (781) 401-9966

Attachments:

4 sheets of Version of Specification Paragraphs with Markings to Show Changes Made

3 sheets of Version of Claims with Markings to Show Changes Made

Q:\rtn\108aus (00E100 - delcheccolo)\RTN-108AUS DRAFT AMENDMENT.doc

G

Version of Specification Paragraphs with Markings to Show Changes Made

Changes to the paragraph beginning at page 4, line 2:

Referring now to Figure 1, a near-object detection (NOD) system 10 is disposed on a vehicle 11 which is here shown in phantom since it is not properly a part of the NOD system 10. The vehicle 11 may be provided for example, as an automotive vehicle such as car, motorcycle, or truck, or a marine vehicle such as a boat or an underwater surface vehicle or as an agricultural vehicle such as a harvester. In this particular embodiment, the near-object detection system 10 includes a forward-looking sensor (FLS) 12 which may be of the type described in U.S. Patent No. 5,929,802, entitled "Automotive Forward Looking Sensor Application," issued July 27, 1999, assigned to the assignee of the present invention, a plurality of side-looking sensor (SLS) systems 16-22 (also referred to as side object detection (SOD) systems 16-22) which may be of the type described in co-pending U.S. Patent Application No. ~~_____~~09/931,636, entitled "Radar Transmitter Circuitry and Techniques," filed August 16, 2001, assigned to the assignee of the present invention and a plurality of rear-looking sensor (RLS) systems 24, 26. The sensors 16-28 may be coupled to the vehicle using a variety of techniques including but not limited to those described in co-pending U.S. Patent Application No. ~~_____~~09/930,868, entitled System and Technique for Mounting a Radar System on a Vehicle, filed August 16, 2001, assigned to the assignee of the present invention. The system 10 can also include a stop and go (SNG) sensor 27. It should be understood that the processing performed by the stop and go sensor 27 and detection zone provided by the sensor 27 can also be provided by the FLS 12 and thus sensor 27 can be omitted. In deciding whether to provide the stop and go processing function from FLS 12 or through a separate sensor (e.g. SNG sensor 27), a trade-off must be made. Exemplary trade off considerations include minimum and maximum desired detection range, zone edge tolerances and reaction time.

G

Changes to the paragraph beginning at page 8, line 2:

In one embodiment, the coverage zone can be modified by adjusting the range gates of the sensor as described in co-pending U.S. Patent Application ~~09/~~09/930,867, entitled "Technique for Changing a Range Gate and Radar Coverage," filed August 16, 2001 assigned to the assignee of the present invention and incorporated herein by reference. In another embodiment, the coverage zone is changed by using a reconfigurable antenna. In still another embodiment, the reconfigurable antenna is provided by using microelectromechanical (MEMs) devices which are used to change beam shape and thus beam coverage. The MEMS can change the aperture shape and thus the shape of the beam.

Changes to the paragraph beginning at page 8, line 10:

It should be noted that with the particular configuration of sensors shown in Fig. 1, seven coverage zones 32-40 are provided as shown in Figure 2. Each of the coverage zones utilize RF detection systems. The RF detection system utilizes an antenna system which provides multiple beams in each of the coverage zones. In this manner, the particular direction in which another object approaching the vehicle or vice-versa can be found. In one particular embodiment, the FLS sensor 12 (Figure 1) utilizes an antenna system which includes eight separate antenna beams. Therefore, the RF system can operate in a manner similar to that described in the above-referenced Patent No. 5,929,802. Similarly, the sensors 16-27 utilizes an antenna system which includes seven separate antenna beams. Therefore, the RF system can operate in a manner similar to that described in the above-referenced U.S. Patent Application No. ~~09/~~09/931,636, entitled "Radar Transmitter Circuitry and Techniques."

Changes to the paragraph beginning at page 13, line 6:

The antenna assembly 67 includes the receive antenna 68 for receiving RF signals and the transmit antenna 69 for transmitting RF signals. In this particular example, the radar system 66 corresponds to a bistatic radar system since it includes separate transmit

and receive antennas positioned proximate one another. The antennas 68, 69 provide multiple beams at steering angles that are controlled in parallel as to point a transmit and a receive beam in the same direction. Various circuitry for selecting the angle of the respective antennas 68, 69 is suitable, including a multi-position switch. An appropriate antenna system may be provided for example as the type described in the aforementioned co-pending U.S. Patent Application No. ~~09/_____~~09/932,574, entitled "Switched Beam Antenna Architecture."

Changes to the paragraph beginning at page 14, line 16:

Each of the sensor systems is disposed on the vehicle 120 such that a plurality of coverage zones exist around the vehicle. Thus, the vehicle is enclosed in a cocoon-like web or wrap of sensor zones. With the particular configuration shown in Figure 2, four coverage zones 68a-68d are used. Each of the coverage zones 68a–68d utilizes one or more RF detection systems. The RF detection system utilizes an antenna system which provides multiple beams in each of the coverage zones 68a-68d. In this manner, the particular direction from which another object approaches the vehicle or vice-versa can be found. One particular antenna which can be used is described in U.S. Patent Application No. ~~09/_____~~09/931,633, entitled "Slot Antenna Element For An Array Antenna," filed August 16, 2001 and assigned to the assignee of the present invention and the aforementioned U.S. Patent Application No. ~~09/_____~~09/932,574, entitled "Switched Beam Antenna Architecture."

Changes to the paragraph beginning at page 14, line 28:

It should be appreciated that the SLS, RLS, and the FLS systems may be removably deployed on the vehicle. That is, in some embodiments the SLS, RLS, and FLS sensors may be disposed external to the body of the vehicle (i.e. on an exposed surface of the vehicle body), while in other systems the SLS, RLS, and FLS systems may be embedded into bumpers or other portions of vehicle (e.g. doors, panels, quarter panels, vehicle front ends, and vehicle rear ends). It is also possible to provide a system which is

a

both mounted inside the vehicle (e.g., in the bumper or other location) and which is also removable. The system for mounting can be of one of the types described in U.S. Patent Application No. ~~09/~~09/930,868, entitled "System And Technique For Mounting A Radar System On A Vehicle," filed August 16, 2001 and -assigned to the assignee of the present invention and U.S. Patent Application No. ~~09/~~09/931,276, entitled "Portable Object Detection System," filed August 16, 2001 and assigned to the assignee of the present invention and these applications are incorporated by reference herein.

Version of Claims with Markings to Show Changes Made

1. (Amended) A near object detection system comprising:

a plurality of sensors, each of the sensors for providing ~~detection coverage~~ range cell data in a predetermined coverage zone ~~and each of the sensors comprising:~~

~~a transmit antenna for transmitting a first RF signal;~~

~~a receive antenna for receiving a second RF signal; and~~

a ~~receiver circuit~~processor, coupled to ~~said received antenna~~receive and process the range cell data to provide a processor output coupled to one or more vehicle systems, wherein said processor includes a target tracker portion adapted to maintain a plurality of track information generated by the plurality of target sensors; and

means for sharing information ~~between~~ from each of the plurality of sensors.

2. (Amended) The system of Claim~~claim~~ 1 wherein said ~~means for sharing information between each of the plurality of sensors comprises~~ processor corresponds to a central sensor processor coupled to each of said plurality of sensors.

3. (Amended) The system of ~~claim~~ Claim 1, wherein said ~~means for sharing information between each of the~~ processor is provided from a plurality of ~~sensors comprises~~sensor processors, each of the ~~a~~ sensor ~~processor~~ processors disposed in ~~each~~ a corresponding one of said ~~sensor circuits~~plurality of sensors; and each of the sensor processors having communication means for allowing information to be shared between each of the plurality of sensor processors.

4. (Amended) ~~–~~A near object detection system for a vehicle, comprising:

a plurality of sensors, each of the sensors for providing detection coverage in respective coverage zones disposed about a perimeter of the vehicle,

wherein each of the sensors has a respective predetermined range, angular extent, and velocity range based upon respective coverage zone requirements.

5. (Amended) The system according to claim 4, wherein the coverage zones include two or~~of~~ more of an adaptive cruise control/night vision zone, a lane keeping zone, a road departure zone, a side object detection zone, a backup and parking aid zone, and a stop and go zone.

6. A near object detection system, comprising:

a plurality of sensors, each of the sensors for providing detection coverage in a predetermined coverage zone;

a multiple hypothesis tracker for processing data from the plurality of sensors to make a hypothesis about data association, resolution, and/or data quality;

a prediction filter coupled to the multiple hypothesis tracker for scheduling the plurality of sensors;

a public track former including a discrimination processor for generating data to control operation of the plurality of sensors;

an estimator/best state vector subsystem coupled to the public track former; and

a vehicle control crash management interface coupled to the estimator/best state vector subsystem and to the discrimination processor.

7. (New) The system according to Claim 6, wherein the predetermined coverage zone includes two or more of an adaptive cruise control/night vision zone, a lane keeping zone, a road departure zone, a side object detection zone, a backup and parking aid zone, and a stop and go zone.

8. (New) The system of Claim 1, wherein said processor further includes a data fuser portion adapted to fuse the plurality of track information into a common filter to increase performance of the plurality of target sensors.

9. (New) The system of Claim 1, wherein the sensors, include at least one of:

an infrared (IR) sensor and a radar sensor.

10. (New) The system of Claim 9, wherein the radar sensor comprises:

a transmit antenna for transmitting an FMCW frequency in a plurality of transmit beams; and

a receive antenna for receiving the FMCW frequency in a plurality of receive beams, which, in combination the transmit beams, provides a pre-determined coverage zone.

11. (New) The system of Claim 10, having at least one transmit beam and at least one receive beam.

12. (New) The system of Claim 10, wherein the predetermined coverage zone has zone characteristics, at least one of which can be statically changed.

13. (New) The system of Claim 12, wherein at least one of the zone characteristics can be dynamically changed to provide an alteration of a time period upon which the target sensor processes a particular transmit beam and a particular receive beam.

14. (New) The system of Claim 9, wherein said processor is provided from a central processor.

15. (New) The system of Claim 9, wherein said processor comprises two or more distributed processors.